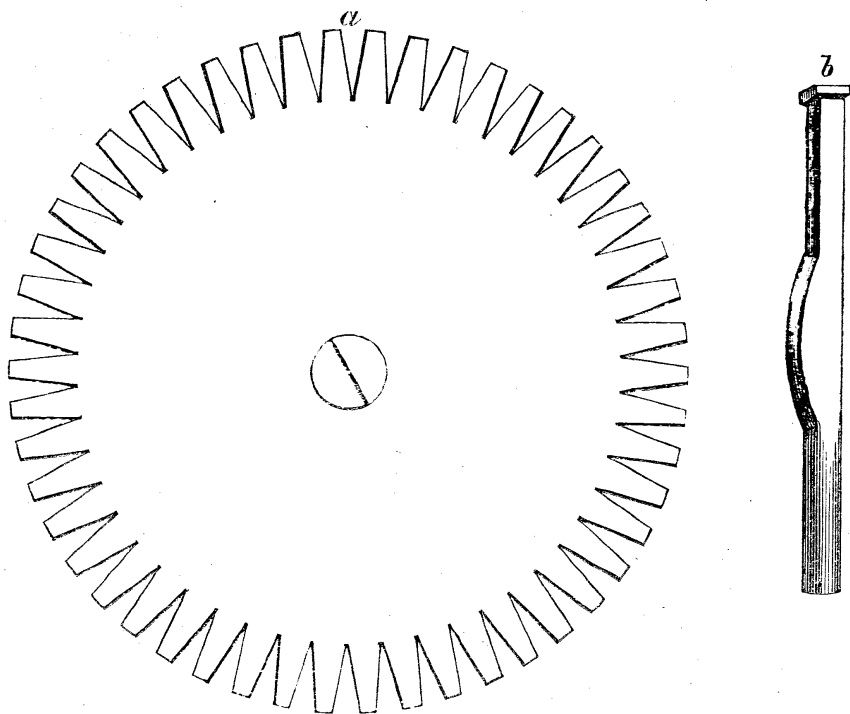


*Description of a Self-Registering Micrometer.* By Mr. A. Bowden.

The general shape of this instrument is that of an ordinary micrometer, with the following modifications.

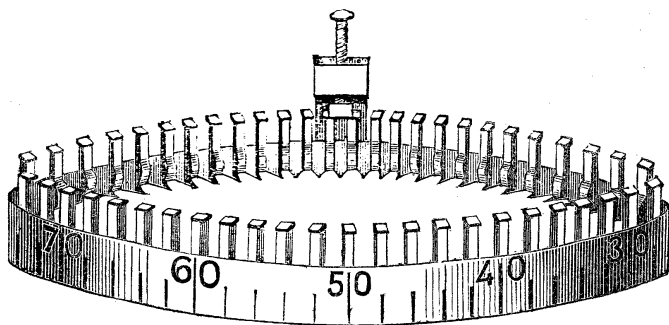
The graduated band has a plate within its circumference at both upper and lower edges; through which are drilled holes immediately within the band and behind each alternate division, so that in a centesimally divided micrometer there are fifty pairs of holes. Through each of these pairs runs a pin (called an *indicator*) shaped as in Fig. 3, *b*, with the points towards the milled

Fig. 3.



head of the micrometer, and the heads standing up on the same side as, and just behind, the index. Through the arm which carries the index, and just behind it, is drilled a hole, through

Fig. 2.



which passes a pin (called the *motor*), having a flat round head

with a square base, and which is kept up, so that the base shall just clear the indicator heads, by a small spiral spring.

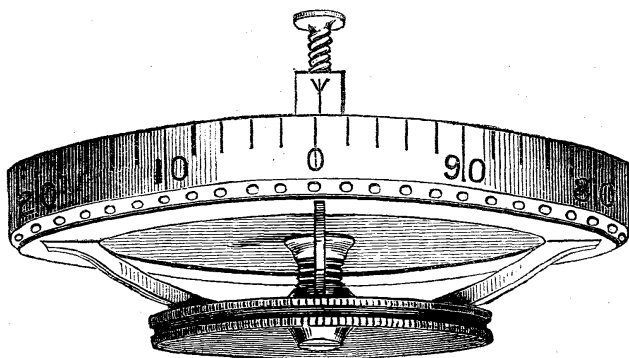
Fig. 2 represents the micrometer head (with the top plate off) ready for use.

When a bisection has been made, the observer presses gently on the head of the motor, thereby driving down the indicator below it, and making its point, which was previously flush with the outer surface of the lower plate, protrude below the band, where it remains. On releasing the motor it springs up, and a fresh bisection may be made. When a sufficient number of bisections have been made, the observer notes the integral number of revolutions in the usual way, and the fractional parts, to hundredths, are taken down from the divisions behind which the indicators protrude.

The relative sizes of the base of the motor and the heads of the indicators are such that, if the micrometer is set so that the index points to any reading not more than half a division on either side of the even division behind which the indicator stands, one indicator only will be driven down; but if the reading is beyond this on either side, two will be projected, and the division between these two will be recorded.

To restore the indicators to their normal positions, a flat ring is carried on the shaft of the micrometer, between the band and the milled head (Fig. 1). This is held down towards the milled

Fig. 1.



head by a spiral spring, and, when pressed up, pushes the indicators back into position. To keep them in position, whether up or down, a thin steel plate, shaped as in Fig. 3, *a*, is fixed between the two plates of the micrometer head, so that an edge of a tooth comes behind each indicator. When the indicator is pressed down, the small protuberance behind it bears on the tooth, which yields and allows it to pass, but immediately straightens and prevents its return till the pressure is given at the other end by the ring described above, when the same action occurs in the opposite direction.

In a micrometer head having a diameter of two inches, the distance between the centres of the indicators would be nearly

in. 1. If it is possible to make their distances as little as 0<sup>in</sup>.05, so as to have an indicator for each division, readings would be recorded to within 0<sup>in</sup>.0025; but even supposing it can only be read to 0<sup>in</sup>.005, which, if 1<sup>r</sup> = say 20'', would give 0<sup>in</sup>.1, this, though not quite so exact as reading from the vernier, practically as accurately records the position of the star in the field, and possesses the advantage of allowing the bisection to be repeated 3, 5, or 7 times.

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Observations of the Spectrum of Comet 1879 d (Palisa). By Lord Lindsay.

The spectrum of this comet was observed at Dun Echt on two nights by Ralph Copeland and J. G. Lohse. It consisted of the usual three bright bands, the middle one being the brightest, while the one of shortest wave-length was by much the faintest. The resulting wave-lengths are:

	Sept. 23. mmm.	No. of Obs.	Oct. 10. mmm.	No. of Obs.
Band 1, centre	552.7	(3)	549.8	(1)
„ 2, towards red edge	513.1	(1)	...	...
„ „ centre	511.0	(1)	512.4	(4)
„ 3 „	468.9	(3)	462.1	(1)

Dun Echt, 1879, Nov. 11.